

FIG. 1

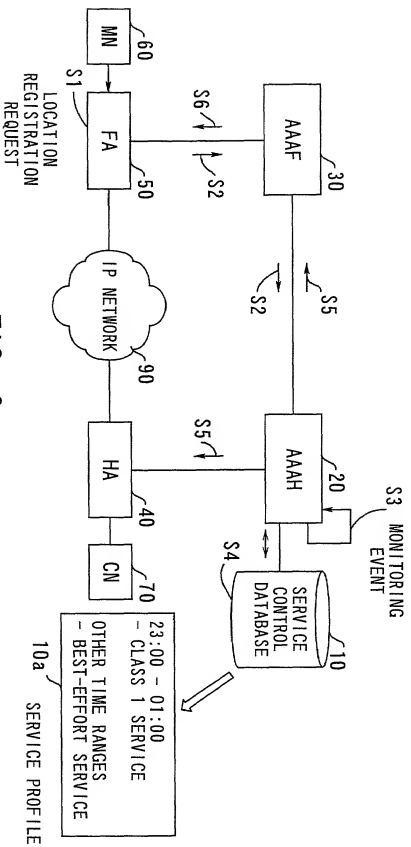


FIG. 2

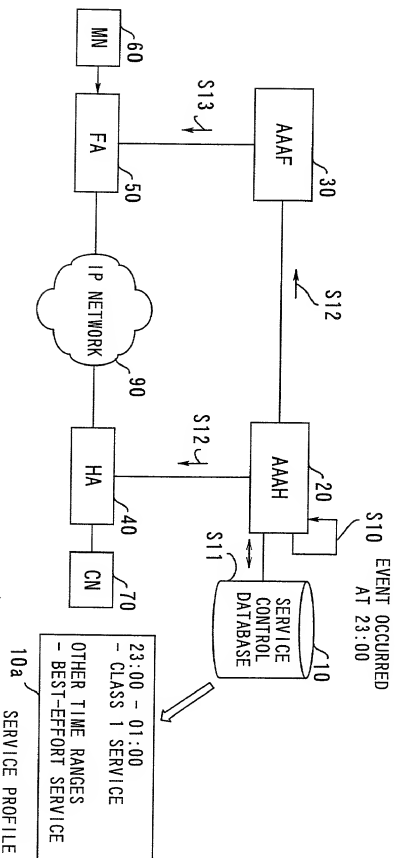
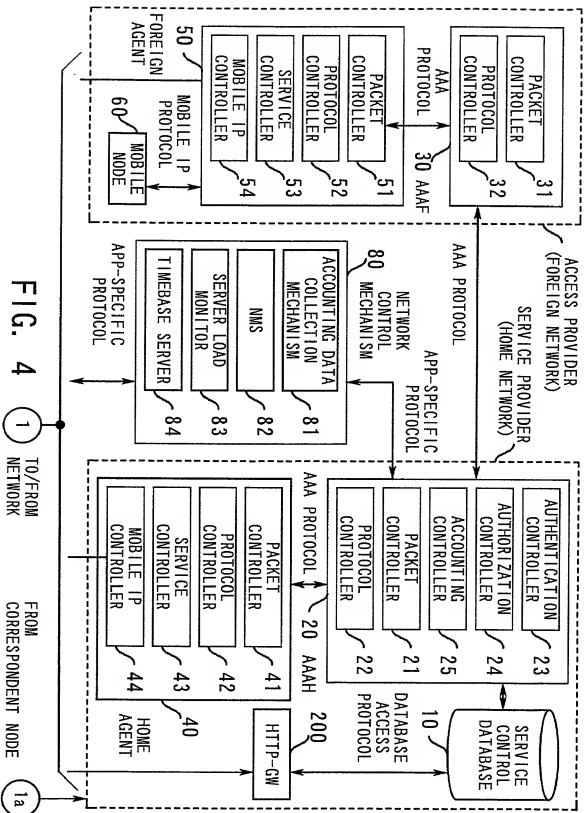


FIG. 3



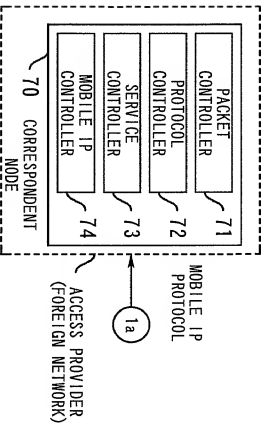
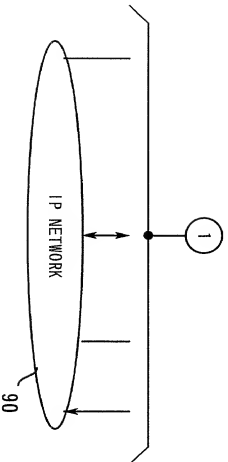


FIG. 5

Data Items		Detailed Data Items		Description
10-1	Profile Identifier	Session Identifier	Profile Number	Indicate session type
				Uniquely assigned to each session
10-2	Packet Extraction Parameters	Source Address		Packet filtering rules
		Source Port No.		
		Destination Address		
		Destination Port No.		
10-3	Routine/ Packet Editing Parameters	Encapsulation (Encryption) Method		How to encapsulate packets to be routed
		Routing Address (Multiple Entries Allowed)		
		Type of Service (TOS)		
		Decapsulation Command		
10-4	Individual Control Data	Service Control Type		<div>Designate which control table to search<ul style="list-style-type: none">- service profile cache- binding cache- MIP home (mobility binding)- MIP foreign (visitor list)- ANYCAST (extended visitor list)- routing table</div>
		Control Data Identifier		

FIG. 6

Service Profile Cache		Description
SPC	Node-specific SPC (NSPC)	A collection of service profiles to be used mainly for user-independent, common services. Indexed by source address information of data packets. Created by a mobility agent at the time of initial set-up, based on static information stored in hard drives and other storage devices of network equipment.
		Service profile applied when there is a hit in NSPCsrc, but no hit in individual control tables.
		A collection of service profiles to be used mainly for user-independent, common services. Indexed by destination address information of data packets. Created by a mobility agent at the time of initial set-up, based on static information stored in hard drives and other storage devices of network equipment.
		Service profile applied when there is a hit in NSPCdst, but no hit in individual control tables.
	AAA Communication (ASPC)	A collection of user-specific service profiles. Indexed by source address information of data packets that are sent from AAA systems when a mobile node logs in to the network.

FIG. 7

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Search Order	Cache Class	Cache Search Result	Individual Control Data Search Result	Next Action
1	ASPCsrc	Hit	Hit	Normal end
		No Hit	No Hit	Abnormal end
2	NSPCsrc	Hit	Hit	Search NSPCsrc
			No Hit	Normal end
3	ASPCdst	Hit	Hit	Search NDSPsrc
			No Hit	Search ASPCdst
4	NSPCdst	Hit	Hit	Normal end
			No Hit	Search NSPCdst
5	NDSP	Hit	Hit	Search NDSPdst
			No Hit	Use NDSP
			Hit	Normal end
			No Hit	Abnormal end

FIG. 8

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Item	Description
Session ID	<NAI of Mobile Node><32-bit Value><Optional Value>
Session Timer	Remaining lifetime of this transaction

FIG. 9

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Item	Description
Session ID	<NAI of Mobile Node><32-bit Value><Optional Value>
AAAH Address	IP address of AAAH identified by mobile node NAI
Home Agent Address	IP address of home agent allocated by AAAF
Previous Foreign Agent NAI	NAI of previous foreign agent to which the mobile node was attached
Current Foreign Agent NAI	NAI of foreign agent to which the mobile node is currently attached
SCR Requester Address	IP address of AAAH that is requesting SCR
Security Information	Authentication data for validate association between this AAAF and other entities (FA, AAAH, HA allocated by AAAH)
Session Timer	Remaining lifetime of this transaction
Foreign Agent Service Profile	See FIG. 3
Home Agent Service Profile	See FIG. 3
Current State	Waiting, HA requested, AMA in process, HA Change Requested, FA Change Requested

FIG. 10

Item	Description
Session ID	<NAI of Mobile Node><32-bit Value><Optional Value>
Home Agent Address	IP address of home agent allocated by AAAH
HA-managing AAAF Address	IP address of AAAF that is allowed by AAAH to allocate home agent
Current AAAF Address	IP address of AAAF requesting AMR
Previous AAAF Address	IP address of previously used AAAF
Address Proxy Address	IP address of address proxy in ANYCAST service
Security Information	Authentication data for validate association between this AAAH and other entities (HA, AAAF)
Session Timer	Remaining lifetime of this transaction
Address Proxy Server Address	IP address of address proxy server
Foreign Agent Service Profile	See FIG. 3
Home Agent Service Profile	See FIG. 3
Current State	Waiting, HA Requested, AMA in Process, HA Change Requested, FA Change Requested

FIG. 11

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Item	Description
Session ID	<NAI of Mobile Node><32-bit Value><Optional Value>
Session Timer	Remaining lifetime of this transaction
Mobility Binding	Pointer to mobility binding
SCR Request Flag	Flag indicating that service profile is being updated in correspondent node
SCR Requester Address	IP address of the entity requesting SCR

FIG. 12

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Item	Description
IP Source Address (Home Address)	Home address assigned to mobile node. Notified by registration request or AMA message
Link Layer Source Address of Mobile Node	Link layer (MAC) address of mobile node
UDP Source Port	UDP Source port of mobile node
Home Agent Address	Address of home agent. Provided in registration request or AMA message
Registration Request Identifier	Identifier used to associate between request and response
Lifetime	Valid period of registration request
Authentication Data	Authentication data used by foreign agent to authenticate requesting mobile node

FIG. 13

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Item	Description
Home Address	Home address assigned to mobile node
Care-of Address of Mobile Node	IP address of foreign agent to which mobile node is currently attached
Correspondent Node with Route Optimization	IP address of correspondent node to which route optimization is being applied
Registration Request Identifier	Identifier used to associate between request and response
Lifetime	Valid Period of Registration Request
Authentication Data	Authentication data used by foreign agent to authenticate requesting mobile node

FIG. 14

Item	Description
User NAI	User's Network Access Identifier (NAI)
User Profile	User name, Address, Phone No. etc.
User Authentication Data	Mobile Node-AAA Authentication Key, SPI, User ID, Password
Service Level Agreement (SLA)	Service agreement with customer
Service-specific Profile	Diffserve, Packet Filtering, ANYCAST, Multi Cast, etc

FIG. 15

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Service Class	Description
Class A	Maximum transmission delay is guaranteed to be within a prescribed tolerance
Class B	In Diffserv, high priority queuing is applied as long as it does not affect Class A traffic. May be divided into several subclasses, depending on Diffserv types
Class C	Best-effort service. Lower priority queuing than Class B.

FIG. 16

532

Item	Description
Flat-rate Accounting (Fixed charge for limited hours, plus additional charge for excess hours)	(Service Class-dependent Basic Charge) + (Service Class-dependent Hourly Rate) * (Excess Hours)
Usage-based Accounting (Proportional to the amount of packets transferred)	Summation of [(Service Class-dependent Rate) * (Total Amount of Packets Transferred to/from Edge Node (Foreign Agent))]

FIG. 17

Control Parameters	Description
Charge	System warns the user when the amount of service charges has exceeded a limit predefined by the user, prompting him/her to decide whether to continue the service.
Time	User may choose a more affordable service which is available only in low-traffic hours. User may choose variable-class service which provides different levels of service depending on the time of day.
Service Class	User may choose variable-class service which provides different levels of service depending on the type of applications, or type of packets, to minimize the usage-based charge.
Roaming Option	User may enable roaming option with additional cost. User may cut the cost by disabling roaming option.

FIG. 18

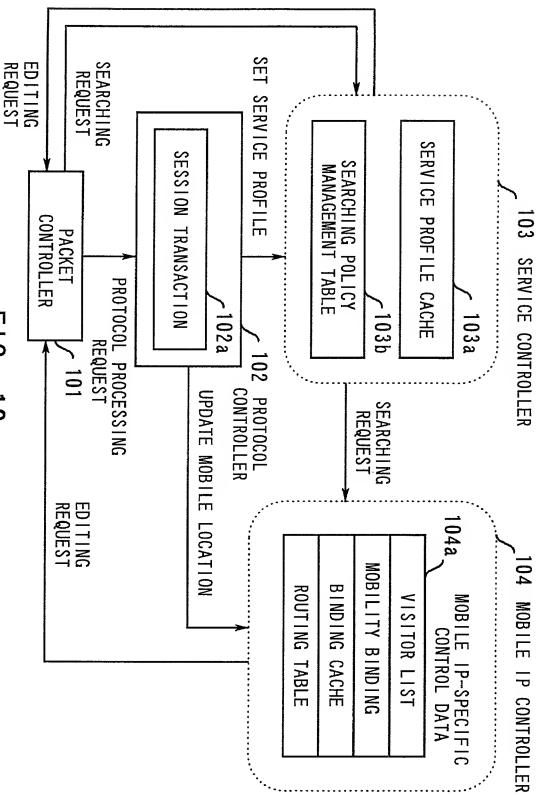


FIG. 19

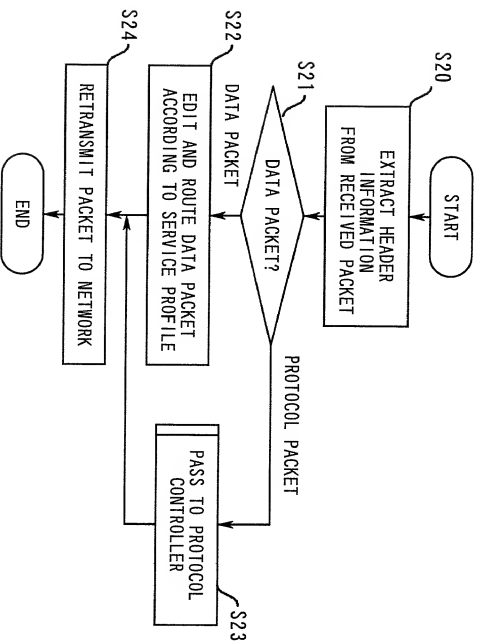


FIG. 20

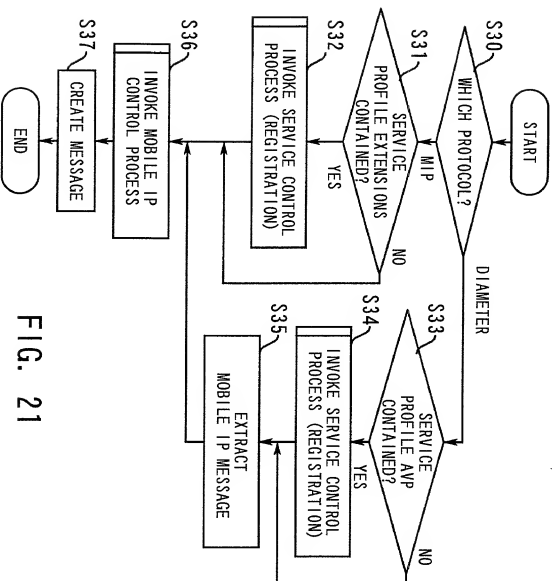


FIG. 21

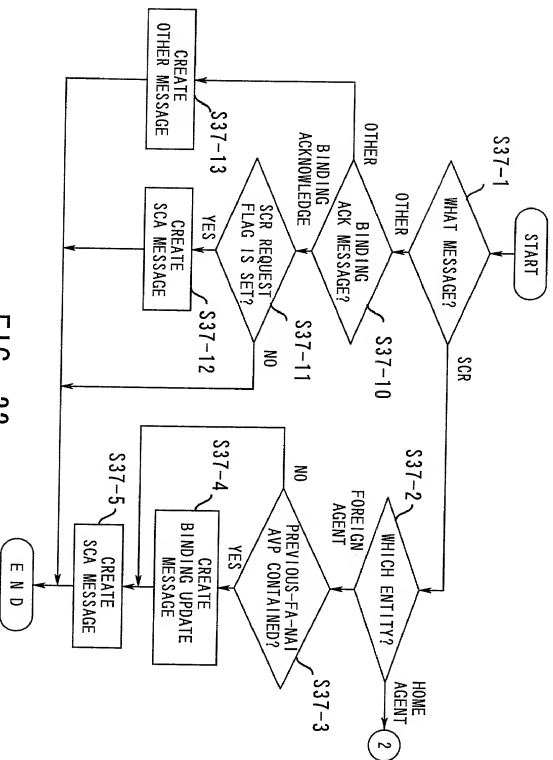


FIG. 22

FIG. 23

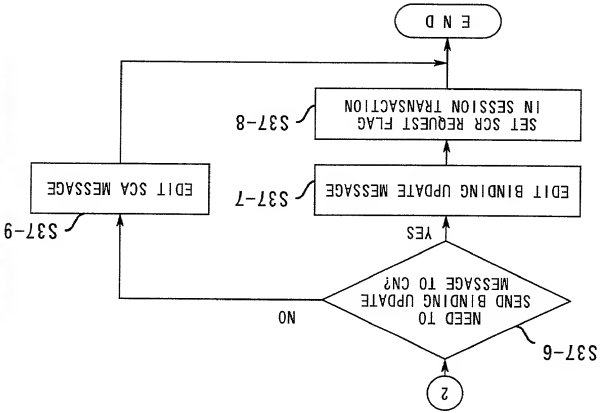
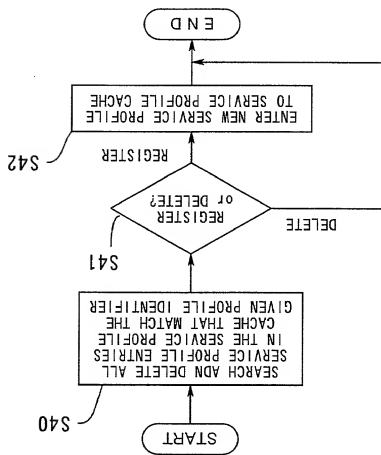


FIG. 24



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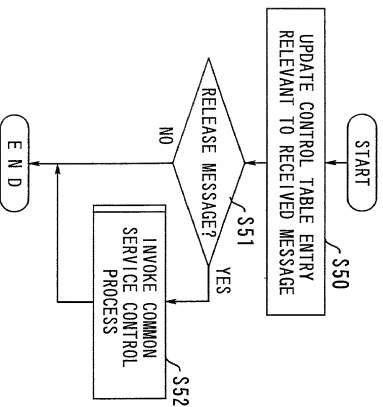


FIG. 25(A)

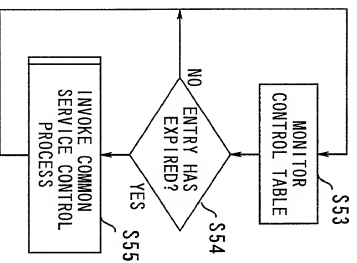


FIG. 25(B)

600

Received Message	Criteria	Preprocessing Entity	Message to be transmitted	Protocol
Registration Request	with AAA extension	Foreign Agent	AMR	DIAMETER
Registration Request	without AAA extension	Foreign Agent	Registration Request	Mobile IP
Registration Response		Home Agent	Registration Reply	Mobile IP
Registration Response		Foreign Agent	Registration Reply	Mobile IP
AMA		Foreign Agent	Registration Reply	Mobile IP
HAR		Home Agent	HAA	DIAMETER
Binding Update		Foreign Agent, Correspondent Node	Binding Acknowledge	Mobile IP
Binding Acknowledge	SCR is present	Home Agent	SCA	DIAMETER
SFR		Foreign Agent, Home Agent	SFA	DIAMETER
SCR	with Previous-FA-NAI AVP	Foreign Agent	Binding Update, SCA	Mobile IP, DIAMETER
	without Previous-FA-NAI AVP	Foreign Agent	SCA	DIAMETER
	Binding Update for CN required	Home Agent	Binding Update	Mobile IP
	No Binding Update for CN required	Home Agent	SCA	DIAMETER

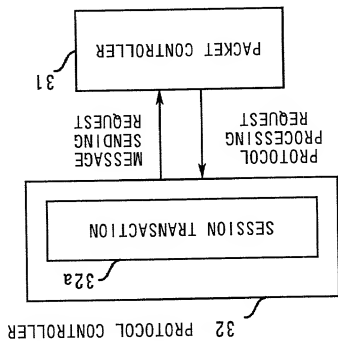
FIG. 26

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Processing Entity		Received Message		Control Table	
Foreign Agent		Registration Request Message		Visitor List	
		Binding Update Message		Binding Cache	
Home Agent		Registration Request Message		Mobility Binding	
Correspondent Node		Binding Update Message		Binding Cache	

FIG. 27

FIG. 28



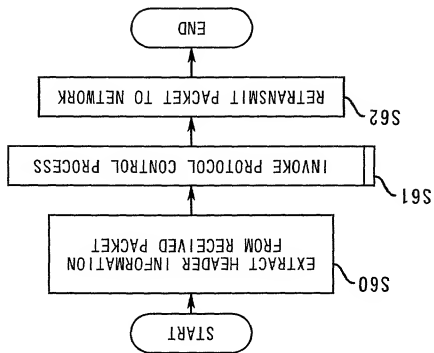


FIG. 29

FIG. 30

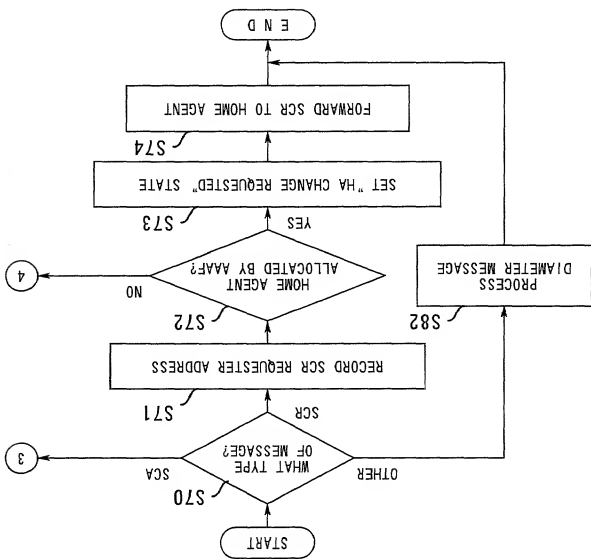
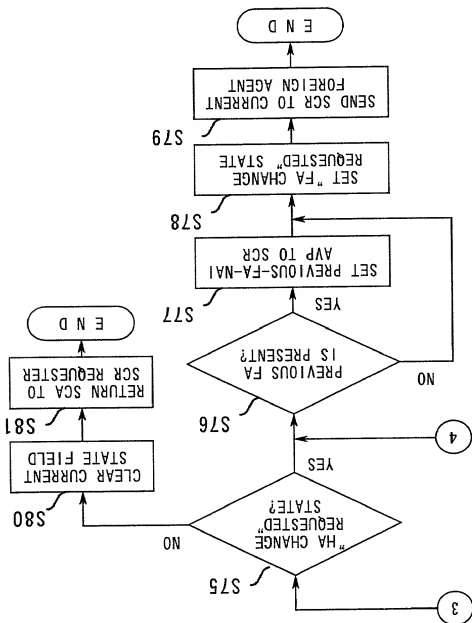


FIG. 31



Message Received	Action to be Invoked	Criteria	Destination	Message to Send
AMR	Create session transaction	with Previous-FA-NAI AVP	AAAH	AMR
		w/o Previous-FA-NAI AVP	Current Foreign Agent	AMA
AMA	Set service profile to session transaction	w/o Home-Agent-Address AVP	Home Agent	HAR
		with Home-Agent-Address AVP	Current Foreign Agent	AMA
HAA	Set home agent address to session transaction		Current Foreign Agent	AMR
SCR	Update service profile	w/o Home Agent allocation	Current Foreign Agent	SCR
		with Home Agent allocation	Home Agent	SCR
SCA	Forward SCA message	in "HA Change Requested" state	Current Foreign Agent	SCR
		in "FA Change Requested" state	AAAH	SCA
SFR	Forward SFR message	w/o Home Agent allocation	Current Foreign Agent	SFR
		with Home Agent allocation	Home Agent	SFR
SFA	Terminate session transaction	in "HA Release Requested" state	Current Foreign Agent	SFR
		in "FA Release Requested" state	AAAH	SFA

FIG. 32

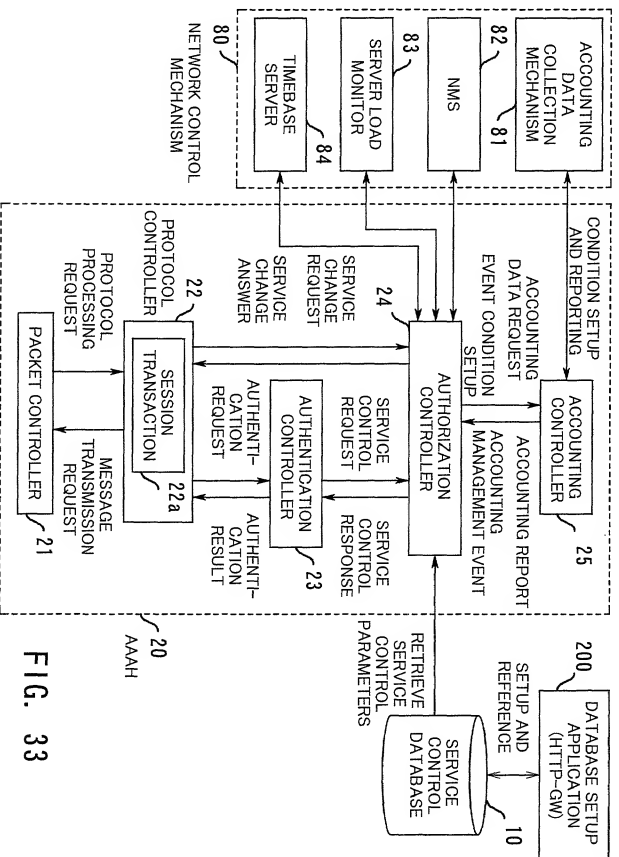
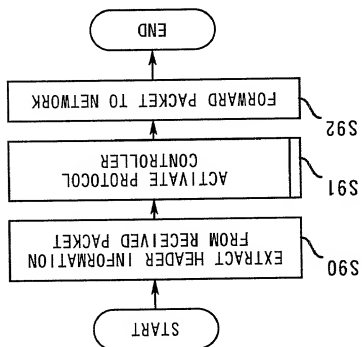


FIG. 33

FIG. 34



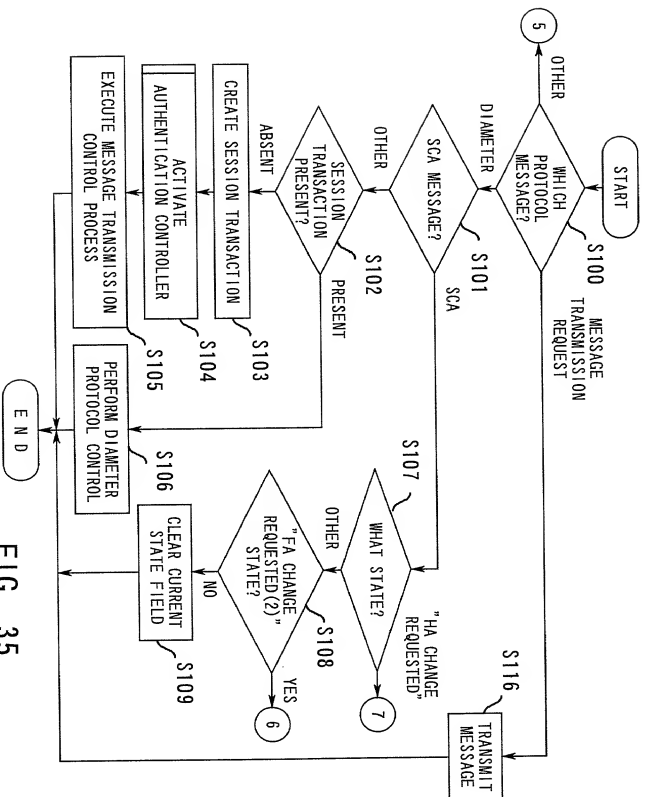


FIG. 35

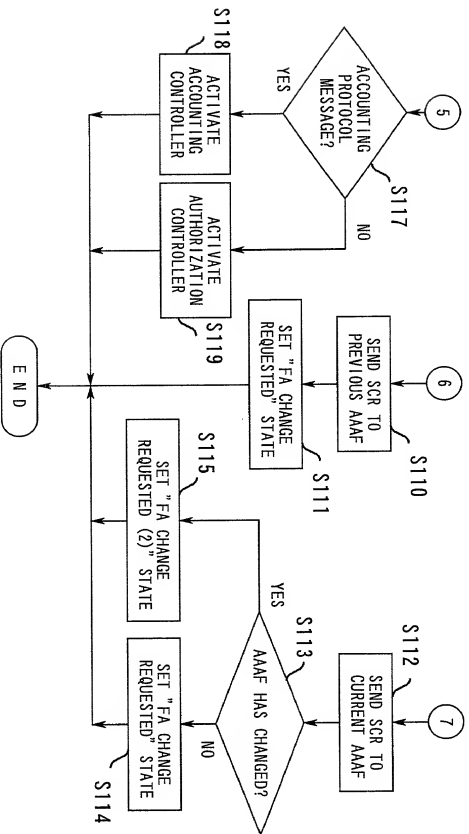


FIG. 36

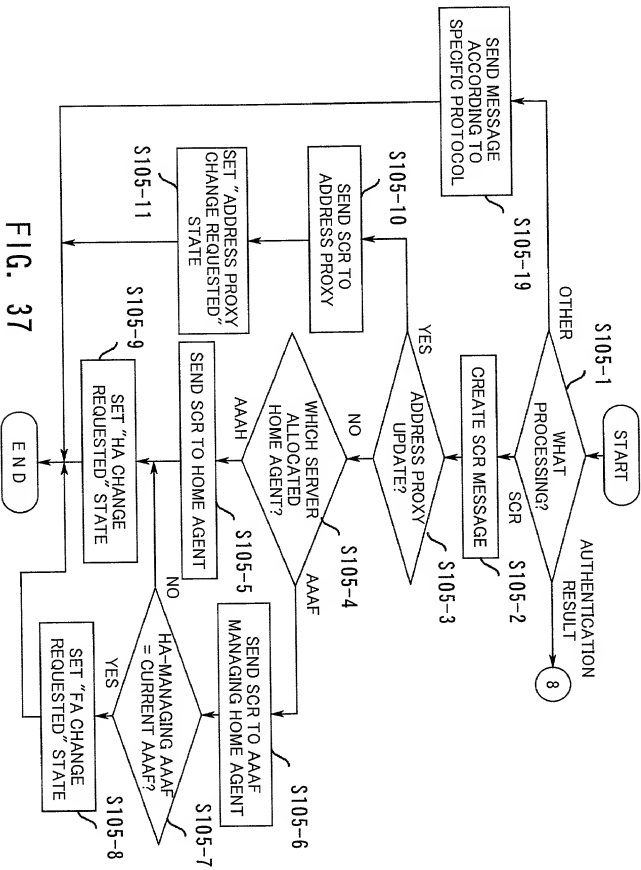


FIG. 37

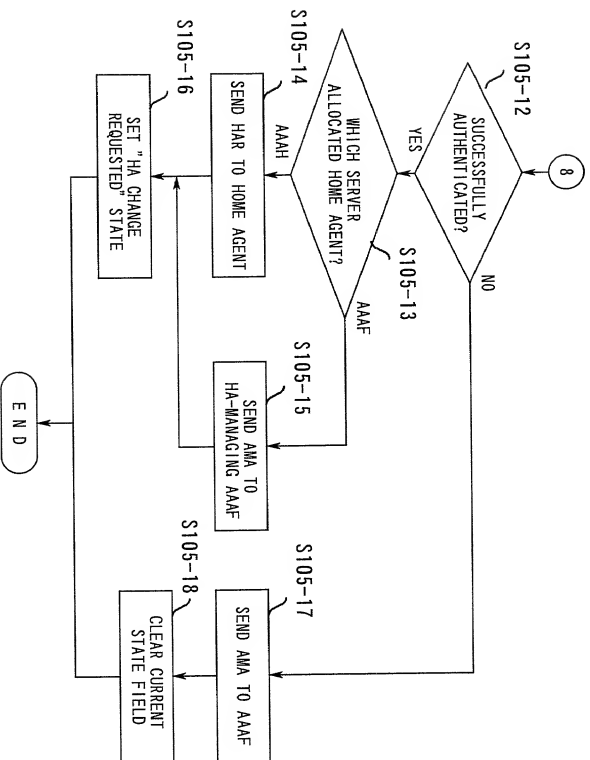
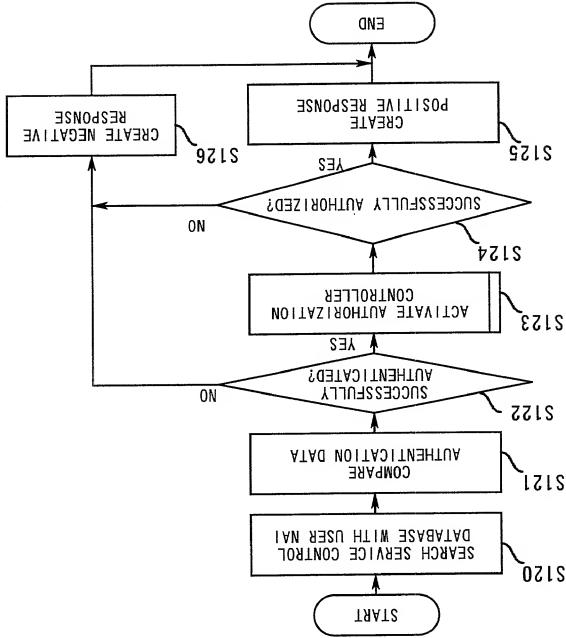
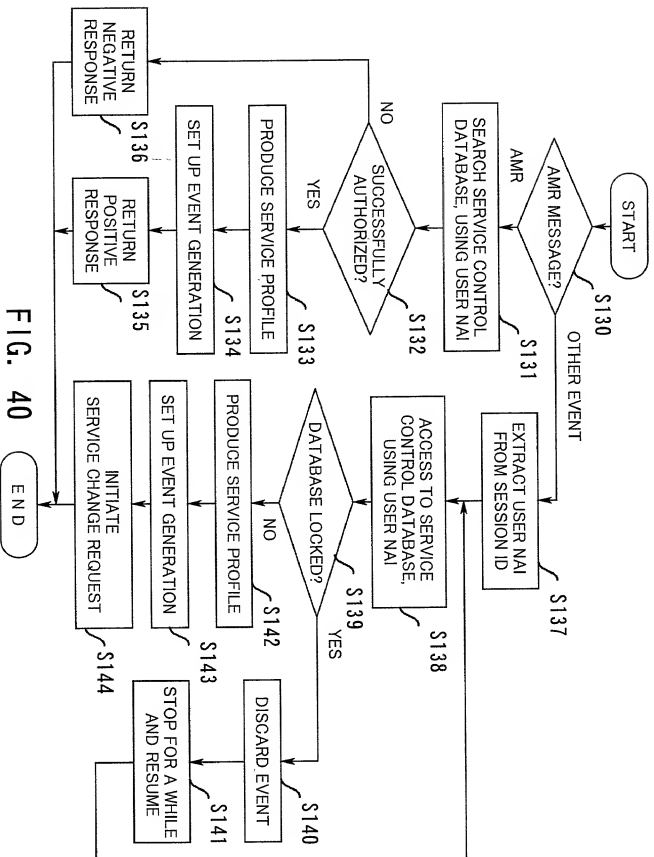


FIG. 38

FIG. 39



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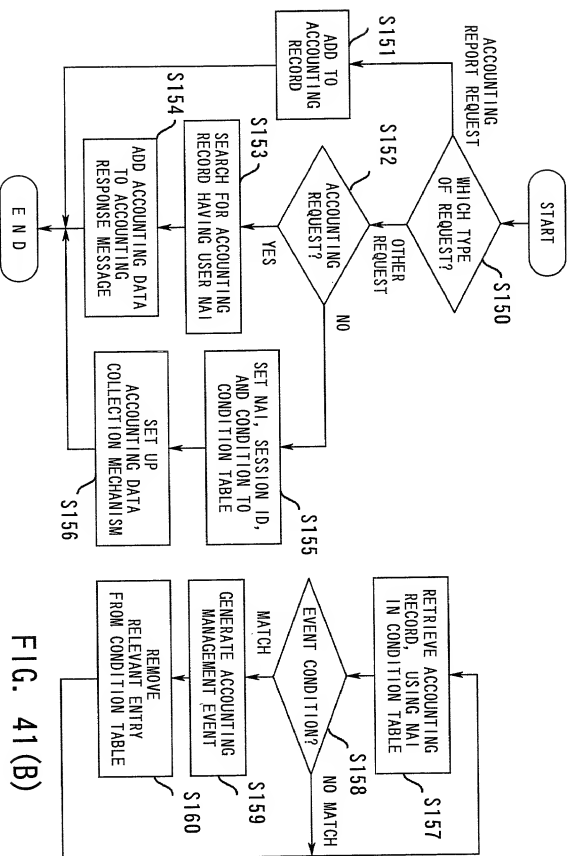


FIG. 41(A)

FIG. 41(B)

Message Received	Action to be Invoked	Criteria	Destination	Message to send
AMR	Create session transaction	w/o Home-Agent-Address AVP	Current AAAF	AMA
		with Home-Agent-Address AVP	Home Agent	HAR
		(Mobile node has roamed into different AAAF domain) and (Home agent has been allocated by previous AAAF)	Purevious AAAF	AMR
AMA	Forward AMA message		Current AAAF	AMA
HAA	Set Home Agent address to session transaction		Current AAAF	AMA
SCA	Forward SCA message	in "HA Change Requested" state	Current AAAF	SCR
SFR	Forward SFR message, and terminate session transaction	w/o Home Agent allocation	Requesting entity	SFA
		with Home Agent allocation	Home Agent	SFR
SFA	Terminate session transaction	in "HA Release Requested" state	Current AAAF	SFR

FIG. 42

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NAI	Session ID	Condition
userA@domain1	<userA@domain1><10.11.22.33><1991029013445>	if \$100 \geq
userB@domain1	<userB@domain1><10.11.22.33><1991029003445>	if \$150 \geq
:	:	:
userZ@domain1	<userZ@domain1><10.12.23.4><1991029091000>	if \$50 \geq

FIG. 43

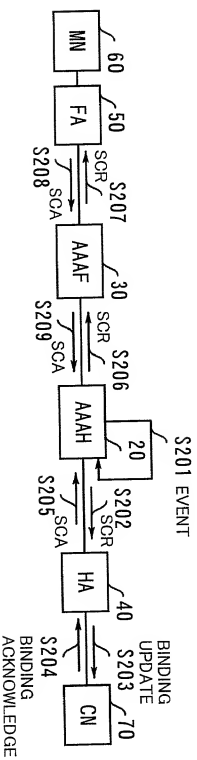


FIG. 44

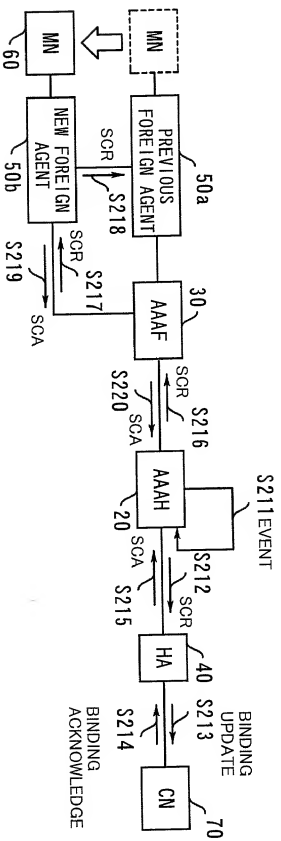


FIG. 45

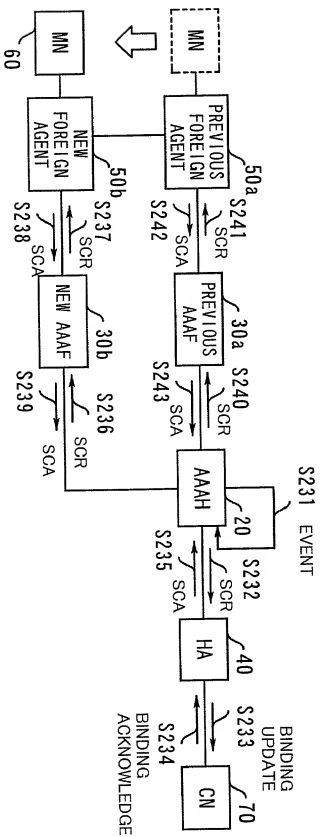


FIG. 46



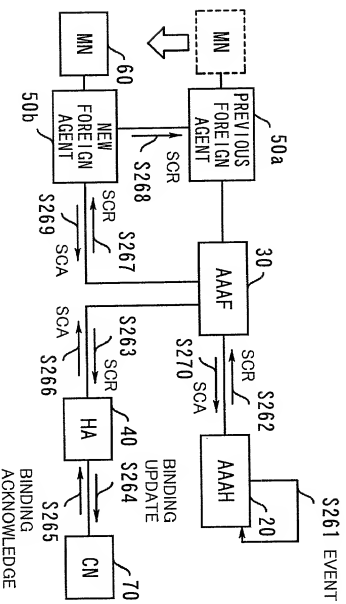


FIG. 48

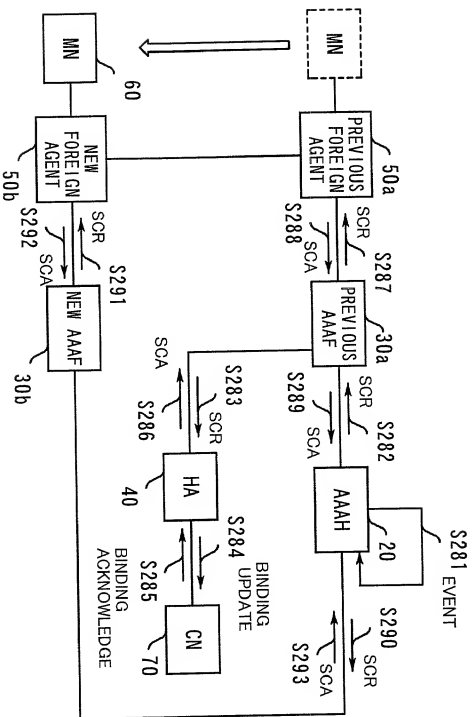


FIG. 49

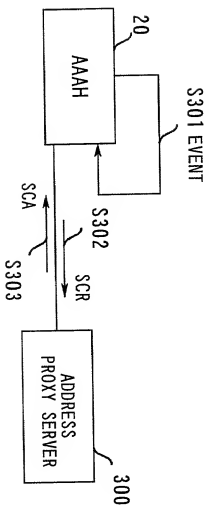


FIG. 50

Service Type		Diffserv
Additional Information 1	Diffserv Activation Policy	*
	Service Class	Class C
	Direction	Upstream
	IP Address	*
	Port No.	*
Additional Information 2	Diffserv Activation Policy	Time : 23:00 to 08:00
	Service Class	Class B
	Direction	Downstream
	IP Address	*
	Port No.	*
Additional Information 3	Diffserv Activation Policy	Time : 08:00 to 23:00
	Service Class	Class C
	Direction	Downstream
	IP Address	*
	Port No.	*

FIG. 51

Service Type		Diffserv
Additional Parameters 1	Diffserv Activation Policy	*
	Service Class	Class C
	Direction	Upstream
	IP Address	*
	Port No.	*
Additional Parameters 2	Diffserv Activation Policy	*
	Service Class	Class B
	Direction	Downstream
	IP Address	*
	Port No.	*
Additional Parameters 3	Diffserv Activation Policy	Amount of Charges \geq \$100
	Service Class	Class C
	Direction	Downstream
	IP Address	*
	Port No.	*

FIG. 52

Service Type		Packet Filtering
Additional Parameters	Filter Activation Policy	(IP Address) AND (Time 08:00 to 21:00)
	IP Address	XXX.XXX.*.*
	Port No.	*

FIG. 53